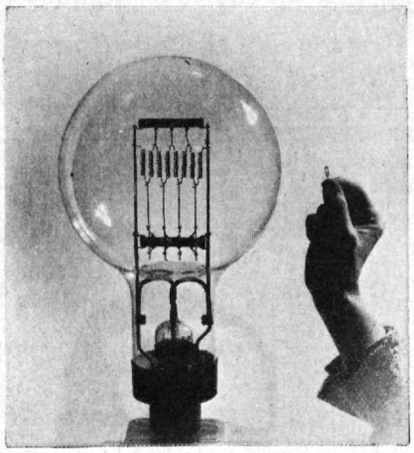


—*Cut courtesy Westinghouse.*

Engineering • Review

Mutt and Jeff of the Lamp Family

About fifty years ago when incandescent lamps were in their infancy, the variety of shapes and sizes could be numbered on the fingers of one hand. Today, after a half a century of artificial illumination with incandescent light sources, there are some 3,000 different kinds of lamps. Many of these have unusual applications and are manufactured only on special order, hence people seldom see these "freaks" of the incandescent lamp family.

Probably one of the most fascinating designs manufactured is the "Grain of Wheat" lamp, so-called because in size and shape it actually resembles a grain of wheat.

The smallest lamp in commercial use today, it consumes only one-fifth of one watt. With a consumption so small it could burn all day long for a year at a cost of only 10c, based on a country-wide average rate per kilowatt hour. These tiny "specks" of light are used in doctor's instruments for exploring the insides of human beings, such as the sinus regions of the head.

Bigger Than Man's Head

At the other extremity in the family of freak lamps is the 10,000 watt lamp, which has a glass bulb larger than a man's head.

With an actual bulb diameter of 12 inches this lamp is 128 times larger than the "Grain of Wheat" lamp and consumes 50,000 times the wattage. The cost of operating such a lamp continuously for a year at the same average kilowatt-hour rate, would be $5,232.

The 10 K. W. lamp is used principally in motion picture studios but also has applications in airport lighting and frequently is used for special lighting occasions where the spectacular is desired.

To view a display of the many different shapes and witness the many characteristics of all the freak lamps in the family of light sources would be like walking into a circus sideshow and viewing the freaks of nature.

One tubular lamp, for example, is about an inch in diameter and a yard long. It is used for pillar light sources in architectural illumination. Another is used in deep sea diving to explore the bottom of the ocean when salvaging the treasures on sunken wrecks, or in the case of Dr. William Beebe who works off the coast of Bermuda, to observe the habits of deep sea fish between 1000 and 2500 feet below the surface.

Everyone is familiar with the Westinghouse Mazda Photoflash lamp which though a valuable tool in photographic work, falls in the class of freak lamps. This lamp contains several sheets of aluminum so thin they will float in air. A small quantity of explosive powder on the filament in the lamp is set off by the inrush of electric current, to produce a flare that burns the aluminum. This creates a brilliant light valuable in a quality of light necessary for exposures. Whereas ordinary incandescent lamps are designed to give an average life of 1,000 hours at the most efficient operating brilliancy, the Photoflash lamp burns for only 1-200th of a second.

—*Westinghouse Technical Press Service.*

Red Christmas is Assured

A new method of heating the soil in greenhouses has resulted in healthier and more vigorous plants, as well as the elimination of losses usually attending the transplanting and cultivation of Poinsettias. The experiments on this work were performed by Mr. Charles Baker, Utica, N. Y.

In these experiments, two beds were used. One bed was subjected merely to the temperature of the greenhouse, while the soil of the other was heated by means of a General Electric soil-heating cable. The temperature was controlled by a thermostat. In the first bed the loss of plants averaged 25%, as compared with no losses in the heated bed.

The electric bed measured 5 by 12 feet, and is 7 inches deep, and is equipped with two 60-foot lengths of cable. During the height of the season as many as 2000 plants were in the bed at one time which was in operation from June 14 to September 15. During that time it consumed 250 kilowatt-hours of energy.

Electric De-Skeeterizers?

Next summer may bring a new electrical appliance into use—the "Electric De-skeeterizer." It's a novel little machine for reproducing the hum of the female mosquito electrically, to lure the unsuspecting male to his death.

The discovery of this apparatus was accidental; one of the men working around a large electric furnace observed that the hum set up by the current attracted hordes of male mosquitoes, who evidently mistook the furnace hum for the call of the "female of the species," and were consequently cooked in the sizzling air over the furnace.

Of course, you wouldn't want an electric furnace capable of producing a temperature ranging around 3,000° F. sitting around the house just to kill mosquitoes; but the same hum can be perfectly reproduced in a little electro-magnetic contrivance no larger than a small radio. And once the skeeters are attracted, endless ways can be devised to render them permanently inactive.

So, cheer up! Skeeter bites, and those blissful summer nights ruined by buzzing bugs may soon be things of the past.

Air Conditioned Trains

Engineers have been making extensive operating tests on recent types of railway air conditioning apparatus. Their purpose is to provide the hot summer traveler with cool, fresh air.

One of the systems devised by Westinghouse consists of a motor driven air compressor, a fan for blowing the air through the condensing unit and other miscellaneous equipment located under the car. The motor which drives the compressor consists of an A. C.-D. C. unit so that the compressor can be operated from axle generator power while on the road or it can be operated from commercial power sources when standing in a terminal.

The refrigerating unit consists primarily of radiators for cooling and dehumidifying the air with the necessary motor driven circulating fans and other auxiliary equipment. All control equipment not contained in the refrigerating or air conditioning units is mounted on panels that can be placed in existing car control cabinets.

Panama Canal Modernizes with Supervisory Control

The U. S. Government recently purchased several units of synchronous-visual supervisory control equipment. This equipment, when installed, will control the Christobal Substation from the Gatun Station, almost seven miles away, using but four small telephone wires. In the same manner the Balboa and Summit Substations will be remotely controlled from the Miraflores Station, 4 and 6.5 miles away respectively.

The equipment manufactured by the Westinghouse Electric and Manufacturing Co., will be arranged to ultimately control and supervise 152 pieces of apparatus, give supervision indications of 29 pieces of apparatus and indicate 13 selective telemetering readings. The apparatus to be remotely controlled consists of high and low tension circuit breakers, motor operated disconnect switches and two synchronous condensers. Supervision indications of transformer temperatures, low battery voltage and bus ground alarm are to be provided. The telemetering will be arranged to give indications of the current in the various transformer secondary circuits and for the two synchronous condensers.

Trigonograph

A new slide rule is now on the market, which, besides its usual capacity as a general calculator, provides a single page complete trigonometric function table and a simpler means for a wide range of trigonometric calculations. It is called the "Trigonograph" and consists essentially of a right triangle with a movable hypotenuse.

Due to the fact that this instrument operates on the principle of the basic form of trigonometry, it should assist the student in understanding that branch of mathematics. Unlike ordinary slide rules, the graduations are uniform non-logarithmic.

The instrument may be obtained in either opaque or transparent celluloid.

Six Electrons Per Second

A new vacuum tube, designated as Pliotron FP-54, is now the world's most delicate measuring instrument. Although it differs little in appearance from an ordinary tube, it is capable of measuring a current flow of 10-18 amperes, or about six electrons per second.

In order to gain a conception of the magnitude of this current, let us consider the six electrons as drops of water. Then the number of electrons flowing through an ordinary 50-watt incandescent lamp is equivalent to the number of drops of water going over Niagara Falls in a whole century.

The chief uses of the tube are the measurement of the light from stars, the counting of cosmic rays, and the recording of neutrons, protons, and alpha particles.

—General Electric College News Service.

A. S. T. M. Bulletin

The American Society for Testing Materials has prepared a pamphlet called the "1932 Index to A.S.T.M. Standard and Tentative Standards." This is designed to be of service to both those who are familiar with A.S.T.M. standards and those who are not. It is of value in ascertaining whether or not the Society has issued any standards on a particular subject.

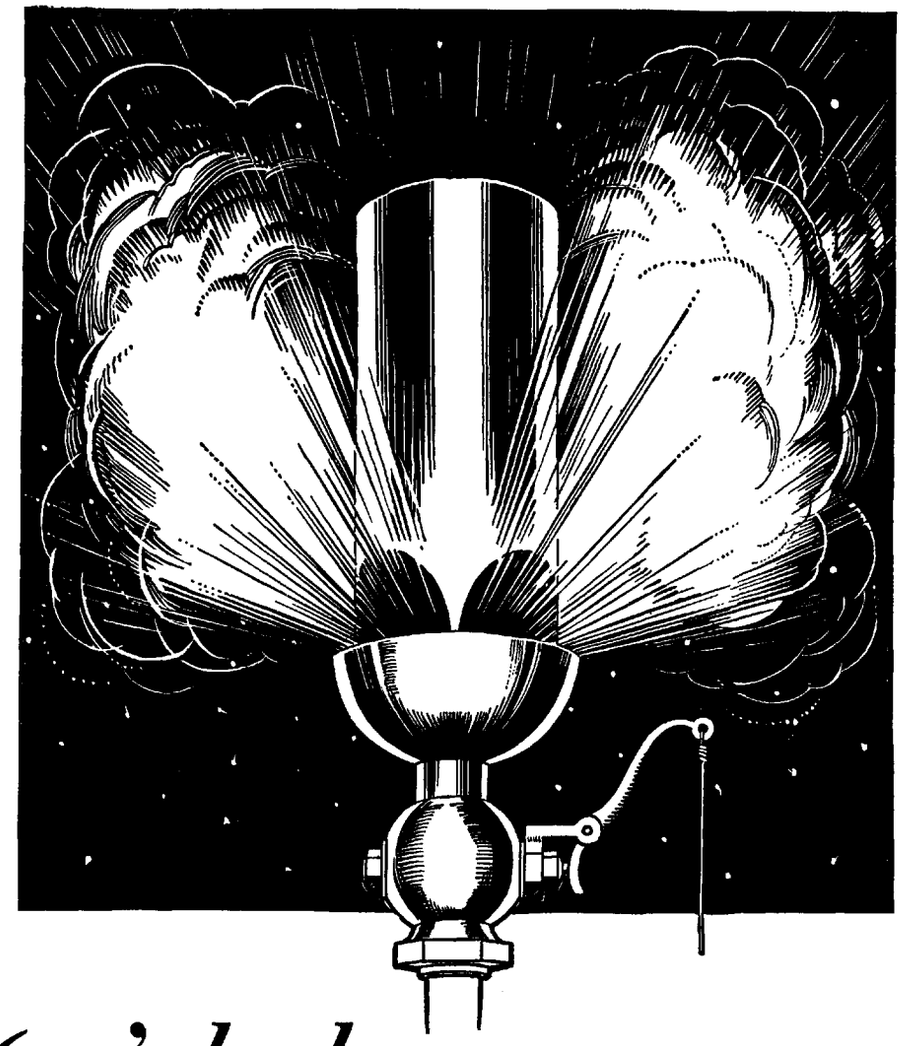
Copies may be obtained without charge at the office of the Ohio State Engineer.

Cut Courtesy Scientific American

● The George Washington Bridge on the Lincoln Highway just east of Pittsburgh has the longest central concrete arch in America. The giant structure spans the Turtle Creek Valley from one hilltop to the other, a distance of 1510 feet. The bridge is composed of five reinforced concrete open spandrel, ribbed arches. The central arch is 425 feet long with 20 panels. This enormous structure required 73,350 cubic yards of reinforced concrete.

Cut Courtesy Railway Age.

● The Stretchers Neck Tunnel, 1,894 feet long near Prince, West Virginia, being widened. The photo shows a mucker in operation and the shield used to protect traffic.



6 o'clock means nothing to telephone service!

Bell System service must go on *all the time*. Day and night, Sundays and holidays, it must handle with speed and accuracy not only the usual traffic but also the unexpected rush of calls.

To meet this obligation, Bell System men tackle problems of many kinds. At Bell Telephone Laboratories, scientists develop new kinds of apparatus. At Western Electric, engineers find ways to make telephones, switchboards and cable more and more reliable. In the telephone companies, traffic engineers devise improved operating methods that make service faster, more accurate, more dependable.

Result: at noon or in the dead of night, the public reaches confidently for the telephone, knowing that Bell System service never stops.

BELL SYSTEM

TELEPHONE HOME ONE NIGHT EACH WEEK
. . . LOWEST RATES AFTER EIGHT-THIRTY